

REMARKS

Claims 1-12 and 17-30 are pending. Withdrawn Claims 13-16 were canceled by the now-entered Amendment After Final Rejection.

Applicant thanks the Examiner for considering B. Stok and A. Mihelic, "Optimal design of the die shape using nonlinear finite element analysis", in Simulation of Materials Processing: Theory, Methods & Applications (1995) pages 625-630.

New dependent Claims 27-30 are supported by original Claims 13-16 respectively, but depend from Claim 1 and thus avoid the issues which led to the restriction of original Claims 13-16. Applicant relies upon remarks in the now-entered Amendment After Final Rejection plus the following additional remarks.

I. 35 USC § 102

Claims 1-8, 12, 17-18, 20-21 are rejected under 35 USC 102(b) as being anticipated by Sun (US 6,044,676). The Office action asserts Sun discloses every element of independent process claim 1 and apparatus claim 17 and the above-mentioned dependent claims. Applicants respectfully contend this is not the case.

A. Process Claim 1

The Final Office action, at paragraph 4, asserts Sun, Fig. 2 shows a starting zone (130) where die and workpiece first meet followed by a subsequent zone labeled 123 in the figure which has an entry angle larger than that of the starting zone.

It appears the Office action misunderstands the exact function of zone 130 and its large radius 131 in Sun.

Applicant respectfully submits Sun clearly states the function of the large radius 131 is to direct the coolant to the location where the ironing takes place.

In Fig. 1 this is illustrated by the arrow marked "coolant spray". Column 4, line 63, states the ironing die has a working surface 104. The chamfer 102 in this figure defines a large angle with the punch 110. The chamfer 102 itself does not contact the metal but serves to direct coolant fluid into the space defined between the ironing die and the can wall 108 (column 5, line 1-4).

Likewise for the embodiment of Fig. 2 relied upon by the Office action, Sun, Col. 5, line 30 explains the die employed has a chamfer 130. This section continues to explain that the chamfer 130 is shaped to control the lubricant/coolant (Col. 5, lines 38-39).

Col. 5, lines 49-55 explains the chamfer and the working surface angle cooperate. This explicitly states the chamfer is not part of the working surface and consequently there is no contact between the metal and the chamfer.

Col. 5, lines 59-60 of Sun speaks of ironing die 130. However, this is an apparent typographical error. This view is supported by Col. 5, line 9 where the ironing die is given the reference number 120 and the chamfer has the reference numeral 130 (Col. 5, lines 31-32). This typographical error may actually be the cause of the misunderstanding on the part of the Examiner because Col. 5, lines 59-60 incorrectly suggests number 130 is the ironing die, thereby presumably leading the Examiner to his assertion that there is contact between 130 and the metal. However, this assertion is incorrect for the reasoning given above.

B. Apparatus Claim 17

As explained above, the chamfer zone 123 of Sun Fig. 2 is designed to not contact the metal workpiece (Sun, col. 5, lines 1-4). Thus, Sun does not disclose a forming surface having a starting zone and a subsequent zone, the entry angle being smaller in the starting zone than in the subsequent zone.

II. Rejections under 35 USC § 103

A. Claims 9-11, 19 and 22-25

Claims 9-11, 19 and 22-25 are rejected as being unpatentable over Sun.

It is respectfully submitted that, as explained in the present application, these features further distinguish over Sun.

B. Claims 1-12 and 17-25

The Office action has also objected to claims 1-12 and 17-25 as being unpatentable over Jansen (US 4,881,394). Applicant relies upon its remarks in the previously filed Amendment After Final Rejection.

C. Claim 26

Claim 26 is rejected as being unpatentable over Sun in view of WO94/22607 or Jansen in view of WO 94/22607. It is respectfully submitted WO '607 does not make up for the deficiencies of Sun or Jansen.

III. Conclusion

In view of the above, it is respectfully submitted that all objections and rejections are overcome. Thus, a Notice of Allowance is respectfully requested.

Respectfully submitted,

Date: May 17, 2004

By:



Anthony P. Venturino
Registration No. 31,674

APV/bms
ATTORNEY DOCKET NO. APV 31151

STEVENS, DAVIS, MILLER & MOSHER, L.L.P.
1615 L Street, N.W., Suite 850
Washington, D.C. 20036
Tel: 202-785-0100 / Fax. 202-408-520